UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/839,436	04/20/2001	Clark T.-C. Nguyen	UOM0233PUS	3445

7590 10/02/2002

David R. Syrowik
Brooks & Kushman P.C.
22nd Floor
1000 Town Center
Southfield, MI 48075-1351

EXAMINER	
DOUGHERTY, THOMAS M	
ART UNIT	PAPER NUMBER
2834	

DATE MAILED: 10/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/839,436	NGUYEN, CLARK T.-C.	
	Examiner	Art Unit	
	Thomas M. Dougherty	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 September 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Response to Arguments

The Applicants' amended claims and REMARKS have been carefully considered. The rejections based on 35 USC § 112 have been overcome. The *Lin et al.* and *Nguyen et al.* references are yet applicable. The Applicants' claims are so very broad that the rejections based on these references can still be applied. The new claims are likewise fairly devoid of structure.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5, 7-9, 11, 13, 15 and 19-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Nguyen et al. article "Design and Performance of CMOS Micromechanical Resonator Oscillators". Said article shows a method for filtering (see col. 2, line 5, where its use for filtering applications is acknowledged) signals to obtain a desired passband of frequencies, the method comprising: providing (see for example fig. 4) a micromechanical filter apparatus including a micromechanical resonator having a fundamental resonant mode formed on a substrate and a support structure anchored to the substrate to support the resonator above the substrate; and vibrating the resonator so that the apparatus passes a desired frequency range of signals while substantially attenuating signals outside the desired frequency range, wherein the support structure is attached to the resonator and the support structure and the

resonaotr are both dimensioned so that the resonator is isolated from the support structure during resonator vibration where energy losses to the substrate are substantially eliminated and wherein the apparatus is a high Q-apparatus. His elements are intercoupled, his is an high-Q apparatus (see abstract). His signals are RF signals and is a bandpass filter apparatus and the support structure includes at least one beam. The resonator is a silicon based filter resonator (see fig. 2 substrate). There is at least one output electrode (see fig. 7). The support structure includes a plurality of beams. The plurality of intercoupled micromechanical elements includes a pair of intercoupled end resonators including a first micromechanical device. And the support structure supports the end resonators above the substrate. The support structure supports the end resonators above the substrate. There are inner resonators intercoupled to the end resonators. Recitiaton of the operations modes are regarded as goals of the invention and not descriptive of a further limiting of structure, as such, the goals carry no patentable weight. The resonator has a Q greater than 5000. See col. 2, line 1. In his figure 4, Nguyen et al. show a support structure comprising a first support beam and a second support beam attached to first and second resonant beams. As they show the claimed structure, the functionality is likewise met. They show a third resonant beam coupled to the first and second resonant beam via a pair of coupling beams.

Claims 1-13 and 15-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin et al. (US 5,537,083). Lin shows (fig. 6A) a method for filtering signals to obtain a desired passband of frequencies, the method comprising: providing (see for example fig. 6A) a micromechanical filter (see ABSTRACT) apparatus including a

micromechanical resonator having a fundamental resonant mode formed on a substrate (see claim 1) and a support structure anchored (50) to the substrate to support the resonator above the substrate; and vibrating the resonator so that the apparatus passes a desired frequency range of signals while substantially attenuating signals outside the desired frequency range, wherein the support structure is attached to the resonator and the support structure and resonator are both dimensioned so that the resonator is isolated from the support structure during resonator vibration (note in the summary, vibration is free and additionally in claim 1 that "said first and second rigid masses are mechanically coupled but able to move independently) wherein energy losses to the substrate are substantially eliminated and wherein the apparatus is a high Q apparatus (col. 2, ll. 30-35). His elements including a first micromechanical resonator are intercoupled (as just noted in reference to claim 1). The step of vibrating includes forcing different portions of the resonator to move in opposite directions at the same time so that the resonator vibrates in a resonant mode, m, higher than the fundamental resonant mode wherein the resonator has m+1 nodal points. Note that any time anything vibrates at a frequency and has a plurality of nodes, it necessarily is vibrating at a frequency higher than its fundamental resonant frequency. As the device is intended for radio filtering, a fairly broad range of frequencies is inherently applicable as input. The micromechanical filter apparatus includes a plurality of input electrodes (fig. 6A) spaced along the resonator to allow electrostatic excitation of the resonator and wherein the step of forcing includes the steps of applying an in-phase signal (V_i) to one of the input electrode to deflect a first portion of the resonator in a first direction and

applying an out-of-phase signal (output of 215) to another input electrode to deflect a second portion of the resonator in a second direction opposite the first direction to force the resonator in to a correct mode shape. Regarding the citation of the structural features of spacers in the method for filtering claims, this feature does not contribute to the further limitation of the methodology and therefore carries no patentable weight. His apparatus, as noted, is a high-Q apparatus. As noted the resonator is free to vibrate. This description means that the support structure is attached to the resonator at at least one nodal point of the resonator. His signals are RF signals and is a bandpass filter apparatus and the support structure includes at least one beam. The apparatus is a silicon based filter apparatus (see col. 2, ll. 18-20). The device further comprises (see fig. 7S for example) at least one spacer (vertical component of 450) extending between the resonator (450) and the substrate at a nodal point (as noted this is inherent as the device freely vibrates, thus nodal connection must take place, otherwise the vibration is not free) of the resonator wherein the size of the gap is based on the height of the at least one spacer during pull down of the resonator. There is at least one output electrode (from 305 and 310). The support structure includes a plurality of beams and the resonator includes a plurality of nodal points and wherein each of the beams is attached to the resonator at one of the nodal points of the resonator so that the resonator sees substantially no resistance (note that the device vibrates freely) to transverse or torsional motion from the support structure. A pair of balanced input electrodes are formed on the substrate (required for figs. 6Q and 6B) to allow electrostatic excitation of the resonator. A pair of balanced output electrodes

(required for figs. 6A and 6B) are formed on the substrate to sense the output of the apparatus. The support structure includes a plurality of beams. The plurality of intercoupled micromechanical elements includes a pair of intercoupled end resonators thus first and second microresonators. And the support structure supports the end resonators above the substrate. The support structure supports the end resonators above the substrate. There are inner resonators intercoupled to the end resonators. Recitation of the operations modes in the Applicants' claims 24 and 25 are regarded as goals of the invention and not descriptive of a further limiting of structure, as such, the goals carry no patentable weight. The resonator has a Q greater than 5000. See col. 2, lines 31-36. In his figure 4, Lin et al. show a support structure comprising a first support beam (e.g. 41) and a second support beam (41) attached to first and second resonant beams (42). As they show the claimed structure, the functionality is likewise met. They show a third resonant beam (e.g. 47 or 48) coupled to the first and second resonant beam via a pair of coupling beams.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US 5,537,083) in view of either ordinary skill in the art or Ella (US 6,278,342). Given the invention of Lin et al. as noted above they fail to show a diamond-based filter apparatus as that description is best understood. It would have been obvious to one having ordinary skill in the art at the time the invention was made to show a diamond-based filter apparatus in the invention of Lin et al., since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416. To wit, see col. 9, lines 11-22 where Ella notes interchangeability of materials in a micromechanical filter device.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Direct inquiry concerning this action to Examiner Dougherty at (703) 308-1628.

tmd

September 29, 2002

THOMAS M. DOUGHERTY
PRIMARY EXAMINER
GROUP 2100